IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	Jerrell Hein		
Title:	RECONFIGURABLE TERMINAL		
Application No.:	10/675,529	Filed:	September 30, 2003
Examiner:	Richard B. Franklin	Group Art Unit:	2181
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APPEAL BRIEF (37 C.F.R. § 41.37)

This brief is in furtherance of the Notice of Appeal, filed on September 28, 2007. The fee required under 37 C.F.R. § 41.20(b)(2) is being paid as directed in an electronic submission of this paper.

REAL PARTY IN INTEREST

The real party in interest in this appeal is Silicon Laboratories Inc., the assignee of record, as evidenced by the assignment recorded at Reel/Frame 014568/0895.

RELATED APPEALS AND INTERFERENCES

Appellant is not aware of any prior and pending appeals, interferences or judicial proceedings which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision for this appeal.

STATUS OF CLAIMS

Claims 1-3, 5-11, 13-20, 22, and 23 are pending. Claims 1-3, 5-11, 13-20, 22 and 23 stand as rejected and are the subject of this appeal.

STATUS OF AMENDMENTS

No amendments have been filed subsequent to the final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

Referring to Fig. 1, realizations of the claimed subject matter include an integrated circuit 10 coupled to a crystal 11 or other resonating device. See paragraph 1019; Fig. 1. Both the integrated circuit 10 and the crystal 11 are packaged in a standard ceramic package 15 that is typically utilized for packaging a voltage controlled crystal oscillator (VCXO). See paragraph 1019; Fig. 1. The package 15 includes standard input/output signals including a voltage control input 17, a power and ground input, 19 and 21 respectively, clock out plus and minus 23 and an output enable pin and terminal 27. See paragraph 1019; Fig. 1.

In order to provide a more flexible clock device, according to an embodiment of the present invention, the OE pin 27 is multi-functional. See paragraph 1024. That is, in one embodiment, the OE terminal functions as a normal enable signal causing the output clock(s) to be either supplied or not according to the voltage level on the OE terminal. See paragraph 1024. In addition, according to an embodiment of the present invention, the OE terminal 27 is also used for programming and calibrating the device 10. See paragraph 1024. In order to program the integrated circuit device, the OE terminal 27 is used to communicate serial data to and from the integrated circuit 10. See paragraph 1024. Thus, in addition to normal enable/disable functionality, in one embodiment of the invention, the OE pin 27 serves as a serial port for access to storage locations internal to integrated circuit 10, thus providing programmability. See paragraph 1024. In an embodiment, the OE pin is bi-directional, implemented as an open drain with a weak pull-up. In some embodiments, the serial communication may be unidirectional into integrated circuit 10. See paragraph 1024.

Adapting the OE terminal to be multi-functional provides both programmability and calibration capability, and because a standard input terminal is utilized for the functions, no special packaging is required, resulting in low cost for the additional functionality. See paragraph 1026. Significantly, the functions can be performed after the device is packaged and sealed. In addition, low frequency test equipment can be used to provide programming and calibration of the devices in a sealed package without any additional package pins. See paragraph 1026.

Referring to Fig. 3, a block diagram illustrates an embodiment of integrated circuit 10 utilized in a six pin VCXO package implementation. See paragraph 1027. In the illustrated embodiment, implementing the multi-functional OE terminal 27 is accomplished as follows. See paragraph 1027. The output enable signal supplied from an external source to OE terminal 27 is provided to control circuit 30, which may include a sampling circuit and a state machine. See paragraph 1027. The control circuit 30 determines whether the received signal is a valid output enable signal, serial data communication, or a calibration clock. See paragraph 1027. If the signal on OE terminal 27 is determined to be a valid output enable signal, then the signal value on OE pin 27 is utilized to generate an internal output enable control signal 31, which in turn enables (or disables) output drivers 33 that supply the differential clock outputs CLKOUT+ and CLKOUT-. See paragraph 1027.

Referring to Fig. 4, in another embodiment the option is provided for using one of two dedicated I/Os on the integrated circuit device. See paragraph 1032. The P1 port 81 is a dedicated I/O that functions as a bidirectional serial port for register data reads and writes, and as a calibration clock input, similar to the function of the OE pin used for programming and calibration described above but without any OE pin functionality. See paragraph 1032. The P2 port 82 is also a dedicated I/O with the same serial bus and calibration clock functionality as P1; however, once programming is completed, P2 can be converted from a dedicated serial port I/O to an input control for the output enable function. See paragraph 1032. Until the dedicated I/O functionality is disabled on P2, there is no output enable pin functionality provided by P2. See paragraph 1032. At the initiation of manufacture test, before the on-chip non-volatile memory (NVM) has been written, either P1 and P2 are able to receive serial bus and calibration clock signals as dedicated I/Os (both should not be used at the same time). See paragraph 1032. At the completion of the manufacture test programming of the various programmable registers, the user may write the programmable register values into non-volatile memory. P2 can then be programmed to function as an output enable control input causing its dedicated programmable I/O functionality to be permanently disabled. See paragraph 1032. That may be accomplished by writing a keyword byte to a programmable register (activate output enable register) to turn on the output enable functionality of the P2 pin and terminate the dedicated serial I/O functionality of the P2 I/O. See paragraph 1032. That may be accomplished using logic gates enabling one function and disabling the other function according to the active output enable register value.

See paragraph 1032. P1 always is available to function as a serial and calibration clock port. See paragraph 1032.

Writing the activate output enable register may cause the value to be written into the non-volatile memory (NVM). See paragraph 1033. Alternatively, a specific command may cause the value in the activate output enable register (and other volatile storage) to be written into the NVM. See paragraph 1033. Once the activate output enable register byte has been written into the non-volatile memory (NVM) with the appropriate keyword byte, the P2 I/O functions as the output enable input which controls the state of the clock output buffer. See paragraph 1033. If the NVM is one-time programmable, the change is permanent. See paragraph 1033. On power up or reset, the value in the NVM is loaded into the register to control the function of P2. See paragraph 1033. The active polarity of the P2 I/O when it has been programmed to function as an output enable pin may be controlled by programmable register bits. See paragraph 1033.

The serial port is typically used during manufacture test to establish the desired device configuration in the on-chip non-volatile memory (NVM) 60. See paragraph 1035. Serial port communications can begin following a power-on-reset of the device. An exemplary command format for the serial bus is shown in Fig. 5. See paragraph 1035. Each transmission consists of 3 eight bit bytes of data: the preamble byte 501, the instruction byte 503, and the address/data byte 505. See paragraph 1035. One extra clock cycle 507 exists for the Read command in order to allow time for placing the transmit output of the test equipment hooked up to the device in high impedance before the first read bit is sent by the device. See paragraph 1035. The serial port state machine, which may be part of deglitching circuit 83, returns to its initialized condition if any invalid input data is detected or if no activity occurs on the bus. See paragraph 1035. That feature guarantees that the state machine can always be brought to a known condition before signaling begins. See paragraph 1035.

Claim 19 is directed to an apparatus including a terminal. Corresponding structures include OE terminal 27 of Figs. 1, 2, and 3 and P2 port 82 of Fig. 4, which are described in corresponding portions of the specification. The apparatus also includes a means for permanently converting the terminal from a first mode of operation in which serial communications are received over the terminal into a second mode of operation in which the

terminal functions as a control input to selectively enable an output according to a voltage value on the terminal, wherein the means for permanently converting is responsive to a serial communication received over the terminal to convert the terminal to the second mode of operation. Exemplary read and write formats for serial communications are described in Fig. 5 and corresponding portions of the specification. A structure corresponding to the apparatus includes control circuit 30 and nonvolatile memory 60 of Fig. 3 and Fig. 4, which is described in corresponding portions of the specification.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Ground I: The rejection of claims 1-3, 5-9, 11, 13-20, and 22-23 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,451,912 to Torode (hereinafter, "Torode") in view of U.S. Patent No. 6,882,214 to Spenea (hereinafter, "Spenea").

Ground II: The rejection of claim 10 under 35 U.S.C. § 103(a) as being unpatentable over Torode in view of Spenea and further in view of U.S. Patent No. 6,670,852 to Hauck (hereinafter, "Hauck").

ARGUMENT

Ground I: The rejection of claims 1-3, 5-9, 11, 13-20, and 22-23 under 35 U.S.C. § 103(a) as being unpatentable over Torode in view of Spenea.

In rejecting the claims, the Examiner engages in an examination that fails to establish a *prima facie* case of obviousness because the references fail to teach or suggest the claimed combination. See In re Nielson, 816 F.2d 1567, 1572, 2 USPQ2d (BNA) 1525, 1528 (Fed. Cir. 1987); see also In re Kahn, 441 F.3d 977, 986, 78 USPQ2d (BNA) 1329, 1335 (Fed. Cir. 2006).

In general, obviousness is a legal determination based on underlying factual inquiries. See Minnesota Min. & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc., 976 F.2d 1559, 1572-73, 24 USPQ2d (BNA) 1321, 1332-33 (Fed. Cir. 1992). Graham v. John Deere Co., 383 U.S. 1, 17 (1966) defines the factual inquiries utilized to evaluate the prior art. Specifically, the prior art is evaluated in terms of: (1) its scope and content; (2) the differences between the prior art and the claimed invention; (3) the level of ordinary skill in the art at the time the application was filed; and (4) objective, or secondary, evidence of nonobviousness such as commercial success, failure of others, long-felt need and unexpected results, which must be considered in reaching a conclusion of obviousness. See Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ (BNA) 459, 460 (1966); Panduit Corp. v. Dennison Mfg. Co., 810 F.2d 1561, 1566-67, 1 USPQ2d (BNA) 1593, 1595-96 (Fed. Cir. 1987); Minnesota Min. & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc., 976 F.2d 1559, 1573, 24 USPQ2d (BNA) 1321, 1333 (Fed. Cir. 1992).

In the present appeal, the issue relates to specific differences between the prior art and appealed claims. All claim limitations must be considered in the obviousness analysis. See Panduit Corp., 810 F.2d at 1576, 1 USPQ2d at 1603–04. None of the references, standing alone or in combination, teach or suggest all of the recited limitations.

Claims 1-3 and 5-9

Specifically, regarding claim 1, Appellant respectfully maintains that Torode, alone or in combination with Spenea or other references of record, fails to teach or suggest

> control circuitry coupled to the terminal to permanently convert the terminal from a first mode of operation in which serial communications are received over the terminal into a second mode of operation in which the terminal functions to selectively enable an output according to a voltage value on the terminal,

as required by claim 1. The final Office action mailed June 29, 2007 (hereinafter, the "final Office action") admits that Torode fails to teach a control circuit coupled to a terminal to permanently convert the terminal from a first mode of operation in which serial communications are received over the terminal into a second mode of operation in which the terminal functions to selectively enable an output according to a voltage value on the terminal, as required by claim 1. The final Office action relies on Spenea to supply this teaching. Spenea teaches PIN A and PIN C, which are a power supply pin and an input pin used to provide power to a programmable fuse array during a trimming and locking procedure, respectively. See Fig. 4; col. 3, lines 43-67. During a trimming procedure, PIN C supplies power to programmable fuse array 2 of Spenea and is not otherwise used during the trimming procedure. See col. 3, lines 43-48. Upon completion of the trimming procedure of Spenea, PIN A is coupled to ground and a voltage on PIN C is increased to blow metal fuse 33, thereby locking trimming circuit 100. See Fig. 4; col. 3, lines 33-67.

In contrast, claim 1 requires control circuitry coupled to the terminal to permanently convert the terminal from a first mode of operation in which serial communications are received over the terminal into a second mode of operation in which the terminal functions to selectively enable an output according to a voltage value on the terminal. Appellant respectfully points out that one obviousness inquiry requires asking "whether the improvement is more than a predictable use of prior art elements according to their established functions." See KSR Int'l Co. v. Teleflex Inc., No. 04-1350, slip op. at 13; 82 USPQ2d 1385, 1396 (U.S. 2007). Appellant maintains that the differences between the claim and the prior art are not predictable uses of prior art elements according to their established functions and the claimed combination does not satisfy other obviousness inquiries (e.g., simple substitution of one known element for another to obtain predictable results, use of a known technique to improve similar devices in the same way,

applying a known technique to a known device ready for improvement to yield predictable results, known work in one field of endeavor prompting variations of it for use in the same field or a different one based on design incentives or other market forces if the variation would have been predictable to one of ordinary skill in the art, or some teaching, suggestion, or motivation in the prior art that would have lead one of ordinary skill to modify the reference or to combine the prior art teachings to arrive at the claimed invention).

The established function of PIN C of Spenea is a power supply input terminal, which may provide a voltage sufficient to blow a metal fuse. See col. 3, lines 33-67. The combination of Torode with Spenea proposed by the Office would change the established function of a terminal from a power supply input of Spenea to an output disable input of Torode, which functions as an output disable input that receives serial input data and also functions as a three-state disable for the F_{OUT} signal. See Torode col. 4, lines 15-17; col. 3, lines 25-28. Appellant respectfully maintains that the Office's proposed combination is not a predictable use of the input terminal of Spenea according to its established function of providing a power supply signal. Thus, the teachings of Torode in combination with Spenea fail to teach or suggest the terminal and the control circuitry required by claim 1.

In addition, Torode, alone or in combination with Spenea or other references of record, fails to teach or suggest that

> the control circuit is responsive to a communication received over the terminal to convert the terminal to the second mode of operation,

as required by claim 1. Torode teaches that

> [t]he programming and control circuit 340 is coupled to the output disable (OD) input so as to receive serial input data. In general, the serial input data contains parameters to specify the output frequency, F_{out}. In order to control the F_{out} frequency, the programming and control circuit 340 is coupled to the phase lock loop 320, post divider 330 and output buffer 350.

See col. 4, lines 15-22. The receipt of serial input data containing parameters to specify output frequency of Torode fails to teach or suggest a communication received over the terminal to convert the terminal to a second mode of operation, as required by claim 1.

Spenea fails to compensate for the shortcomings of Torode. Spenea teaches configuring PIN A and PIN C to provide a current sufficient to blow a fuse after a trimming process is complete. Col. 3, lines 55-61. In contrast, claim 1 requires a control circuit coupled to permanently convert a terminal from a first mode of operation in which serial communications are received over the terminal into the second mode of operation, the control circuit being configured to receive a communication over the terminal to convert the terminal to the second mode of operation. The current that blows the fuse of Spenea fails to teach or suggest a communication received over a terminal to convert the terminal to a second mode of operation, as required by claim 1. Nowhere does Spenea teach or suggest that limitation of claim 1. Thus, the combination of Torode and Spenea fails to establish a *prima facie* case of obviousness of the limitations of claim 1. Accordingly, the PTO's rejection of claims 1-3 and 5-9 should be reversed.

Claim 22

Appellant respectfully maintains that Torode, alone or in combination with Spenea or other references of record, fails to teach or suggest that

> the terminal is not operable in the second mode until the terminal is permanently converted to operate in the second mode,

as required by claim 22. As discussed above with regard to claim 1, the final Office action admits that Torode fails to teach and Appellant maintains that Spenea fails to teach or suggest a control circuit coupled to a terminal to permanently convert the terminal from a first mode of operation into a second mode of operation, as required by claim 1 from which claim 22 indirectly depends. However, assuming *arguendo* that the locking of the trimming circuit is a permanent conversion of PIN C of Spenea, Appellant respectfully maintains that Spenea fails to teach or suggest that the the terminal is not operable in the second mode until the terminal is permanently

converted to operate in the second mode, as required by claim 22. The first mode of operation of the terminal of claim 22 requires serial communications to be received over the terminal, and in the second mode of operation, the terminal functions as an output enable signal. Spenea teaches using PIN A and PIN C to lock a trimming circuit, as described above. Spenea teaches that the intended function of PIN C is "an input pin that is not involved in the trimming procedure." See col. 3, lines 45-47. Although PIN C of Spenea is not involved in the trimming procedure, Spenea fails to teach or suggest that PIN C is not operable as an input pin until the trimming circuit is locked. Indeed, during the trimming procedure, DLOCK2 31 of Spenea isolates PIN C from metal fuse 33 and programmable fuse array 2 and thus, PIN C may be operable as an input pin even if the trimming circuit is not locked. See Fig. 4; col. 3, line 56-col. 4, line 27. Nor does Spenea teach the first and second mode of operation as claimed. Combining Spenea and Torode also fails to achieve claim 22 because the combination results in a pin that is able to blow a fuse, but does not provide a pin that is operable in the first and second modes as claimed. Since the Office fails to provide a reference that teaches or suggests the limitations of claim 22, Appellant respectfully requests that the rejection of claim 22 be reversed.

Claim 11, 13, 16-18, 23

Specifically, regarding claim 11, Appellant respectfully maintains that Torode, alone or in combination with Spenea or other references of record, fails to teach or suggest

> utilizing a terminal in a first mode of operation in which serial communications are received over the terminal; and subsequently, permanently converting the terminal to a second mode of operation in response to a received command, in which the terminal functions as an input control for selectively enabling an output according to a value of terminal voltage, the second mode of operation permanently disabling the first mode of operation,

as required by claim 11. The final Office action admits that Torode fails to teach permanently converting the terminal to a second mode of operation in response to a received command, in

which the terminal functions as an input control for selectively enabling an output according to a value of terminal voltage, the second mode of operation permanently disabling the first mode of operation, as required by claim 11. The final Office action relies on Spenea to supply this teaching. Spenea teaches PIN A and PIN C, which are a power supply pin and an input pin, respectively. See Fig. 4; col. 3, lines 43-55. During a trimming procedure, PIN C supplies power to programmable fuse array 2 of Spenea and is not otherwise used during the trimming procedure. Col. 3, lines 43-48. Upon completion of the trimming procedure of Spenea, PIN A is coupled to ground and a voltage on PIN C is increased to blow metal fuse 33, thereby locking trimming circuit 100. Fig. 4; col. 3, lines 33-67. PIN C of Spenea is an input pin used to provide power to a programmable fuse array during a trimming and locking procedure.

In contrast, claim 11 requires utilizing a terminal in a first mode of operation in which serial communications are received over the terminal; and subsequently permanently converting the terminal to a second mode of operation in response to a received command, in which the terminal functions as an input control for selectively enabling an output according to a value of terminal voltage, the second mode of operation permanently disabling the first mode of operation. Appellant respectfully points out that one obviousness inquiry requires asking "whether the improvement is more than a predictable use of prior art elements according to their established functions." See KSR Int'l Co. v. Teleflex Inc., No. 04-1350, slip op. at 13; 82 USPQ2d 1385, 1396 (U.S. 2007). Appellant maintains that the differences between the claim and the prior art are not predictable uses of prior art elements according to their established functions and the claimed combination does not satisfy other obviousness inquiries (e.g., simple substitution of one known element for another to obtain predictable results, use of a known technique to improve similar devices in the same way, applying a known technique to a known device ready for improvement to yield predictable results, known work in one field of endeavor prompting variations of it for use in the same field or a different one based on design incentives or other market forces if the variation would have been predictable to one of ordinary skill in the art, or some teaching, suggestion, or motivation in the prior art that would have lead one of ordinary skill to modify the reference or to combine the prior art teachings to arrive at the claimed invention).

The established function of PIN C of Spenea is a power supply input terminal, which may provide a voltage sufficient to blow a metal fuse. See col. 3, lines 33-67. The combination of Torode with Spenea proposed by the Office would change the established function of a terminal from a power supply input of Spenea to an output disable input of Torode, which functions as an output disable input that receives serial input data and also functions as a three-state disable for the F_{OUT} signal. See Torode col. 4, lines 15-17; col. 3, lines 25-28. Further, the power supply input taught by Spenea is not a received command, as required by claim 11. Appellant respectfully maintains that the Office's proposed combination is not a predictable use of the input terminal of Spenea according to its established function of providing a power supply signal. Thus, the teachings of Torode in combination with Spenea fail to teach or suggest the utilization of a terminal and the subsequent conversion of the terminal required by claim 11. Accordingly, the PTO's rejection of claims 11, 13, 16-18, 23 should be reversed.

Claims 14 and 15

Specifically, regarding claim 14, Appellant respectfully maintains that Torode, alone or in combination with Spenea or other references of record, fails to teach or suggest that

> converting the terminal from the first mode to the second mode of operation in response to the command being received over the terminal,

as required by claim 14. Torode teaches that

> [t]he programming and control circuit 340 is coupled to the output disable (OD) input so as to receive serial input data. In general, the serial input data contains parameters to specify the output frequency, F_{out}. In order to control the F_{out} frequency, the programming and control circuit 340 is coupled to the phase lock loop 320, post divider 330 and output buffer 350.

See col. 4, lines 15-22. The receipt of serial input data containing parameters to specify output frequency of Torode fails to teach or suggest converting the terminal from the first mode to a second mode of operation in response to the command being received over the terminal, as required by claim 14.

Spenea fails to compensate for the shortcomings of Torode. Spenea teaches configuring PIN A and PIN C to provide a current sufficient to blow a fuse after a trimming process is complete. Col. 3, lines 55-61. In contrast, claim 14 requires converting the terminal from the first mode in which serial communications are received over the terminal into the second mode of operation in response to a command being received over the terminal. The current that blows the fuse of Spenea fails to teach or suggest a command serially communicated over a terminal to convert the terminal to a second mode of operation, as required by claim 14. Nowhere does Spenea teach or suggest that limitation of claim 14. Thus, the combination of Torode and Spenea fails to establish a *prima facie* case of obviousness of the limitations of claim 14. Accordingly, the PTO's rejection of claims 14 and 15 should be reversed.

Claims 19 and 20

Specifically regarding claim 19, Appellant respectfully maintains that Torode, alone or in combination with Spenea or other references of record, fails to teach or suggest

> means for permanently converting the terminal from a first mode of operation in which serial communications are received over the terminal into a second mode of operation in which the terminal functions as a control input to selectively enable an output according to a voltage value on the terminal,

as required by claim 19. The final Office action admits that Torode fails to teach a means for permanently converting a terminal from a first mode of operation in which serial communications are received over the terminal into a second mode of operation in which the terminal functions as a control input to selectively enable an output according to a voltage value on the terminal, as required by claim 19. The final Office action relies on Spenea to supply this teaching. Spenea teaches PIN A and PIN C, which are a power supply pin and an input pin, respectively. See Fig. 4; col. 3, lines 43-55. During a trimming procedure, PIN C supplies power to programmable fuse array 2 of Spenea and is not otherwise used during the trimming procedure. Col. 3, lines 43-48. Upon completion of the trimming procedure of Spenea, PIN A is coupled to ground and a voltage on PIN C is increased to blow metal fuse 33, thereby locking

trimming circuit 100. Fig. 4; col. 3, lines 33-67. PIN C of Spenea is an input pin used to provide power to a programmable fuse array during a trimming and locking procedure.

In contrast, claim 19 requires means for permanently converting the terminal from a first mode of operation in which serial communications are received over the terminal into a second mode of operation in which the terminal functions as a control input to selectively enable an output according to a voltage value on the terminal. Appellant respectfully points out that one obviousness inquiry requires asking "whether the improvement is more than a predictable use of prior art elements according to their established functions." See KSR Int'l Co. v. Teleflex Inc., No. 04-1350, slip op. at 13; 82 USPQ2d 1385, 1396 (U.S. 2007). Appellant maintains that the differences between the claim and the prior art are not predictable uses of prior art elements according to their established functions and the claimed combination does not satisfy other obviousness inquiries (e.g., simple substitution of one known element for another to obtain predictable results, use of a known technique to improve similar devices in the same way, applying a known technique to a known device ready for improvement to yield predictable results, known work in one field of endeavor prompting variations of it for use in the same field or a different one based on design incentives or other market forces if the variation would have been predictable to one of ordinary skill in the art, or some teaching, suggestion, or motivation in the prior art that would have lead one of ordinary skill to modify the reference or to combine the prior art teachings to arrive at the claimed invention).

The established function of PIN C of Spenea is a power supply input terminal, which may provide a voltage sufficient to blow a metal fuse. See col. 3, lines 33-67. The combination of Torode with Spenea proposed by the Office would change the established function of a terminal from a power supply input of Spenea to an output disable input of Torode, which functions as an output disable input that receives serial input data and also functions as a three-state disable for the F_{OUT} signal. See Torode col. 4, lines 15-17; col. 3, lines 25-28. Appellant respectfully maintains that the Office's proposed combination is not a predictable use of the input terminal of Spenea according to its established function of providing a power supply signal. Thus, the teachings of Torode in combination with Spenea fail to teach or suggest the terminal and the control circuitry required by claim 19.

In addition, Torode, alone or in combination with Spenea or other references of record, fails to teach or suggest that

> the means for permanently converting is responsive to a serial communication received over the terminal to convert the terminal to the second mode of operation,

as required by claim 19. Torode teaches that

> [t]he programming and control circuit 340 is coupled to the output disable (OD) input so as to receive serial input data. In general, the serial input data contains parameters to specify the output frequency, F_{out}. In order to control the F_{out} frequency, the programming and control circuit 340 is coupled to the phase lock loop 320, post divider 330 and output buffer 350.

See col. 4, lines 15-22. The receipt of serial input data containing parameters to specify output frequency of Torode fails to teach or suggest a serial communication received over the terminal to convert the terminal to a second mode of operation, as required by claim 19.

Spenea fails to compensate for the shortcomings of Torode. Spenea teaches configuring PIN A and PIN C to provide a current sufficient to blow a fuse after a trimming process is complete. Col. 3, lines 55-61. In contrast, claim 19 requires the means for permanently converting is responsive to a serial communication received over the terminal to convert the terminal to the second mode of operation. The current that blows the fuse of Spenea fails to teach or suggest a serial communication received over a terminal to convert the terminal to a second mode of operation, as required by claim 19. Nowhere does Spenea teach or suggest that limitation of claim 19. Thus, the combination of Torode and Spenea fails to establish a *prima facie* case of obviousness of the limitations of claim 19. Accordingly, the PTO's rejection of claims 19 and 20 should be reversed.

Ground II: The rejection of claim 10 under 35 U.S.C. § 103(a) as being unpatentable over Torode in view of Spenea and further in view of Hauck.

Specifically, regarding claim 10, Appellant respectfully maintains that Torode, alone or in combination with Spenea or other references of record, fails to teach or suggest

> control circuitry coupled to a terminal to permanently convert the terminal from a first mode of operation in which serial communications are received over the terminal into a second mode of operation in which the terminal functions to selectively enable an output according to a voltage value on the terminal,

as required by claim 10. The final Office action admits that Torode fails to teach control circuitry coupled to a terminal to permanently convert the terminal from a first mode of operation in which serial communications are received over the terminal into a second mode of operation in which the terminal functions to selectively enable an output according to a voltage value on the terminal, as required by claim 10. The final Office action relies on Spenea to supply this teaching. Spenea teaches PIN A and PIN C, which are a power supply pin and an input pin, respectively. See Fig 4; col. 3, lines 43-55. During a trimming procedure, PIN C supplies power to programmable fuse array 2 of Spenea and is not otherwise used during the trimming procedure. Col. 3, lines 43-48. Upon completion of the trimming procedure of Spenea, PIN A is coupled to ground and a voltage on PIN C is increased to blow metal fuse 33, thereby locking trimming circuit 100. Fig. 4; col. 3, lines 33-67. PIN C of Spenea is an input pin used to provide power to a programmable fuse array during a trimming and locking procedure.

In contrast, claim 10 requires control circuitry coupled to the terminal to permanently convert the terminal from a first mode of operation in which serial communications are received over the terminal into a second mode of operation in which the terminal functions to selectively enable an output according to a voltage value on the terminal. Appellant respectfully points out that one obviousness inquiry requires asking "whether the improvement is more than a predictable use of prior art elements according to their established functions." See KSR Int'l Co. v. Teleflex Inc., No. 04-1350, slip op. at 13; 82 USPQ2d 1385, 1396 (U.S. 2007). Appellant maintains that the differences between the claim and the prior art are not predictable uses of prior art elements according to their established functions and the claimed combination does not satisfy other obviousness inquiries (e.g., simple substitution of one known element for another to obtain predictable results, use of a known technique to improve similar devices in the same way, applying a known technique to a known device ready for improvement to yield predictable

results, known work in one field of endeavor prompting variations of it for use in the same field or a different one based on design incentives or other market forces if the variation would have been predictable to one of ordinary skill in the art, or some teaching, suggestion, or motivation in the prior art that would have lead one of ordinary skill to modify the reference or to combine the prior art teachings to arrive at the claimed invention).

The established function of PIN C of Spenea is a power supply input terminal, which may provide a voltage sufficient to blow a metal fuse. See col. 3, lines 33-67. The combination of Torode with Spenea proposed by the Office would change the established function of a terminal from a power supply input of Spenea to an output disable input of Torode, which functions as an output disable input that receives serial input data and also functions as a three-state disable for the F_{OUT} signal. See Torode col. 4, lines 15-17; col. 3, lines 25-28. Appellant respectfully maintains that the Office's proposed combination is not a predictable use of the input terminal of Spenea according to its established function of providing a power supply signal. Thus, the teachings of Torode in combination with Spenea fail to teach or suggest the terminal and the control circuitry required by claim 10.

In addition, Torode, alone or in combination with Spenea, Hauck or other references of record, fails to teach or suggest that

> a second terminal that functions as a dedicated programmable input/output terminal over which serial communications and a calibration clock are received, the second terminal not being convertible into a dedicated input control for an output enable function,

as required by claim 10. The final Office action admits that Torode in combination with Spenea fails to teach that limitation of claim 10 and the Office relies on Hauck to supply that teaching. Hauck teaches that an input signal, IN, may be received on a pin 120. See col. 2, lines 6-20; Fig. 2. Hauck teaches further that "[t]he signal IN may be a periodic signal having a reference frequency." See col. 2, lines 10-12. Claim 10 requires the terminal to function as a dedicated I/O terminal over which serial communications and a calibration clock are received. Nowhere

does Hauck teach or suggest that pin 120 receives serial communications as required by claim 10.

Furthermore, Appellant respectfully points out that

> [o]ften, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate this review, this analysis should be made explicit.

KSR Int'l Co. v. Teleflex Inc., No. 04-1350, slip op. at 13; 82 USPQ2d 1385, 1396 (U.S. 2007). Moreover, "'[a] reference may be said to teach away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference or would be led in a direction divergent from the path that was taken by the applicant.'" In re Kahn, 441 F.3d 977, 990, 78 U.S.P.Q.2d (BNA) 1329, 1338 (Fed. Cir. 2006) (citations omitted). Torode teaches that an object of the invention is "to provide a programmable crystal oscillator that does not require any dedicated programming connections." Col. 1, lines 64-66. The Office action fails to provide a proper rationale for combining a dedicated programming connection with a programmable crystal oscillator that is designed to not require dedicated programming connections and thus impermissibly introduces hindsight into the obviousness analysis. In particular, the Office action states that allowing in-system tuning of a crystal oscillator is the motivation to combine Torode and Spenea with Hauck. However, Torode states that "the programmable crystal oscillator 100 is housed within a package having a plurality of connections and no dedicated programming connections." See col. 2, line 66-col. 3, line 1 (emphasis added). Thus, Torode teaches away from combination with Hauck to include a second terminal that functions as a dedicated programmable input/output terminal, as applied by the Office action and the combination of Torode, Spenea, and Hauck fails to establish a *prima facie* case of obviousness of the limitations of claim 10. Accordingly, the PTO's rejection of claim 10 should be reversed.

CONCLUSION

For the at least the foregoing reasons, Appellant's presently claimed invention would not have been obvious to one of ordinary skill in the art under 35 U.S.C. § 103(a) in view of the cited prior art. Accordingly, this honorable Board is respectfully requested to reverse the rejections of claims 1-3, 5-11, 13-20, 22, and 23 and to direct the claims of the present application to be issued.

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that, on the date shown below, this correspondence is being

- ☐ deposited with the US Postal Service with sufficient postage as first class mail in an envelope addressed as shown above.
- ☐ facsimile transmitted to the USPTO.
- ☒ transmitted using the USPTO electronic filing system.

Nicole Teitler Cave — 11/28/07 (Date)

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Respectfully submitted,

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CLAIMS APPENDIX

1. An apparatus comprising:

a terminal; and

control circuitry coupled to the terminal to permanently convert the terminal from a first mode of operation in which serial communications are received over the terminal into a second mode of operation in which the terminal functions to selectively enable an output according to a voltage value on the terminal;

wherein the control circuit is responsive to a communication received over the terminal to convert the terminal to the second mode of operation.

2. The apparatus as recited in claim 1 wherein once the terminal is converted to the second mode of operation the first mode of operation for the terminal is permanently disabled.

3. The apparatus as recited in claim 1, wherein a terminal configuration determining the mode of operation of the terminal is stored in a non-volatile memory.

5. The apparatus as recited in claim 1 wherein the serial communication received over the terminal in the first mode of operation includes a command and write data.

6. The apparatus as recited in claim 1, wherein the control logic distinguishes between a calibration clock received on the terminal and serial communications when in the first dedicated mode of operation.

7. The apparatus as recited in claim 1 wherein the output enable function is for controlling the output of one or more clocks.

8. The apparatus as recited in claim 6 further comprising:

a controllable oscillator coupled to receive a reference frequency and to supply a clock signal that is coupled to an output terminal that is controlled by the terminal

functioning to selectively enable the output according to the voltage value on the terminal; and

a resonating device coupled to supply the reference frequency.

9. The apparatus as recited in claim 8 wherein the terminal is on a package, the package including an integrated circuit and a resonating device, the integrated circuit including the controllable oscillator, and the resonating device being one of a crystal and surface acoustic wave (SAW) device.

10. An apparatus comprising:

a terminal;

control circuitry coupled to the terminal to permanently convert the terminal from a first mode of operation in which serial communications are received over the terminal into a second mode of operation in which the terminal functions to selectively enable an output according to a voltage value on the terminal; and

a second terminal that functions as a dedicated programmable input/output terminal over which serial communications and a calibration clock are received, the second terminal not being convertible into a dedicated input control for an output enable function.

11. A method comprising:

utilizing a terminal in a first mode of operation in which serial communications are received over the terminal; and

subsequently permanently converting the terminal to a second mode of operation in response to a received command, in which the terminal functions as an input control for selectively enabling an output according to a value of terminal voltage, the second mode of operation permanently disabling the first mode of operation.

13. The method as recited in claim 11, further comprising storing a terminal configuration selecting one of the first and second modes of operation in a non-volatile memory.

14. The method as recited in claim 11 further comprising converting the terminal from the first mode to the second mode of operation in response to the command being received over the terminal.

15. The method as recited in claim 14 wherein the communication includes a command and write data.

16. The method as recited in claim 11, further comprising:

receiving a calibration clock on the terminal in the first mode of operation; and

distinguishing between the calibration clock and serial communications in control logic coupled to the terminal.

17. The method as recited in claim 11 further comprising controlling one or more clock outputs according to the voltage value of the terminal in the second mode of operation.

18. The method as recited in claim 11 wherein the terminal is on a package, the package including an integrated circuit and a resonating device, the resonating device being one of a crystal and surface acoustic wave (SAW) device.

19. An apparatus comprising:

a terminal; and

means for permanently converting the terminal from a first mode of operation in which serial communications are received over the terminal into a second mode of operation in which the terminal functions as a control input to selectively enable an output according to a voltage value on the terminal;

wherein the means for permanently converting is responsive to a serial communication received over the terminal to convert the terminal to the second mode of operation.

20. The apparatus as recited in claim 19, further comprising a non-volatile memory for storing a terminal configuration determining the mode of operation of the terminal.

22. The apparatus as recited in claim 2 wherein the terminal is not operable in the second mode until the terminal is permanently converted to operate in the second mode.

23. The apparatus as recited in claim 11 wherein the terminal is not operable in the second mode until the terminal is permanently converted to operate in the second mode.

EVIDENCE APPENDIX

There is no evidence submitted pursuant to 37 C.F.R. § 1.130, 1.131, or 1.132 or any other evidence entered by the examiner and relied upon by appellant in the appeal.

RELATED APPEALS APPENDIX

There are no decisions rendered by a court or the Board in any proceeding identified above in the Related Appeals and Interferences section.